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AUTHOR Moock, Lynn D.
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ABSTRACT

An evaluator studied the effectiveness of the displaced worker entry-level and the upgrade components of the electronics/robotics training program. Since the program was a pilot project with attendant trials and errors, a user-focused process of evaluation was selected. Entry-level students, administrators, the counselor, and instructors completed questionnaires and were interviewed. Upgrade training participants were surveyed, and the instructor and project director completed questionnaires and were interviewed. Of the 28 displaced workers who began training, 18 completed the program. The assessment process provided a good indicator of who could succeed. The instructor thought the program length and pace were comparable to a private vocational school. Some students thought the pace was good, others thought it too fast. One month after the program ended, four students were employed. Eighteen people were enrolled in and completed a course, "Introduction to Robotics," which was designed for electronics technicians who wanted to learn about robotics. Enrollment was not as high as anticipated. Generally, the students were satisfied with the course. The instructor and some students thought the course should be offered in two semesters, not one. Suggestions were offered to funding sources and program operators when designing future retraining programs. (Data tables are appended.) (YLB)

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EVALUATION REPORT

OHLONE COLLEGE

INVESTMENT IN PEOPLE PROJECT 1983-84

ELECTRONICS/ROBOTICS

Displaced Worker Retraining
and
Technician Upgrade Training

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prepared

by

Lynn D. Moock
LYNN MOOCK & ASSOCIATES
3843 Burton Common
Fremont, CA 94536
(415) 791-8335

CE039774

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EXECUTIVE SUMMARY

EVALUATION REPORT

OHLONE COLLEGE
ELECTRONICS/ROBOTICS

Displaced Worker Entry Level Training
and
Technician Upgrade Training

I. BACKGROUND

Plant closures, mass lay-offs, displaced workers, sunset industries. and few marketable skills describe one population Ohlone College in Fremont serves. Equally applicable are the words high technology, rapid growth, shortage of skilled workers, and sunrise industries. Fremont is an expansion area for Silicon Valley.

In that setting, Ohlone College requested and received grants to offer intensive training programs in Computer Aided Drafting (CAD) and in Electronics/Robotics. The programs would retrain 24 displaced workers and upgrade the skills of 24 people currently working who could become displaced, if they did not keep pace with technological advances.

This evaluation studied the displaced worker entry level component and the upgrade component of the electronics/robotics program.

The Chancellor's Office of the California Community Colleges selected Ohlone College to receive a grant through its Investment in People program for $49,323. The displaced worker component was also funded by a grant from the State Job Training Council under the Job Training Partnership Act (JTPA). The project was designed to utilize the combined resources of IIP, JTPA, Ohlone College, and employers.

II. Purpose of Study

A. Entry Level

This evaluation studied the effectiveness of this program in retraining displaced workers. Answers to the following questions were sought: Were the assessment procedures sufficient to select students with the best opportunity for success? Were the majority of students able to absorb the material in the time available? Did they secure jobs? What did administrators, counselors, students, and instructors think about the effectiveness of the program, problems encountered, advantages, revisions, and offering a similar program?

B. Upgrade Training

In assessing the effectiveness of this component, the evaluator looked at the educational level of the participants, their expectations, course modifications, student perceptions and suggestions, and recommendations by the project director and instructor.

III. METHODOLOGY

This program was a pilot project subject to all the trials and errors of action program at this stage of development. Therefore, a user focused process of evaluation was selected. The design was discussed with the Dean of Instruction, project director, counselor, and drafting instructor to insure that the evaluation would answer their questions and the measures would have meaning to them.

A. Entry Level

Students completed questionnaires in May and August and had the opportunity to express their concerns in group discussion. Administrators the counselor, and instructors completed similar questionnaires. The evaluator also met individually with them several times during the project and at its conclusion. Data on a comparison class from the regular drafting program was collected. June, 1984 A.A. graduates were surveyed regarding their subsequent employment. Information on other retraining programs was sought. Assessment scores were correlated with grades and completion. Costs of the program were compared with benefits to students.

B. Upgrade Training

Participants were surveyed at the beginning, middle, end, and several weeks after the last class. The instructor and project director completed questionnaires and were interviewed. Cost/benefit information was considered.

IV. FINDINGS

GENERAL INFORMATION: 28 displaced workers began training November 9, 1983. 18 completed the program 43 weeks later on September 14, 1984. With some individual variations, they received 1170 hours of training and earned 45 units of college credit. One month later, 4 were employed. 5 women and 23 men enrolled. 3 women and 15 men persisted.

QUESTION 1: Was the assessment process sufficient to select students with the best opportunity for success?

The assessment process provided a good indicator of who could succeed. High correlations existed between assessment scores and grade point average (GPA). Applicants took three assessment tests (math, reading, and interest). No correlation appeared between assessment scores and completion/non-completion. Factors other than those tested affected retention.

The profile of a displaced worker who completed the program showed

assessment scores of Math 10.4, Reading 11.8, and Interest 5. Math and reading scores represent grade levels. These scores were almost identical to the mean scores of completers in the drafting program. 3 was the recommended score in the interest inventory by the manufactuer. Another training program suggested 5.

The project director, counselor, instructor and most of the students thought "lack of money" was the primary reason most students withdrew. Students also listed poor instructors in the first modules, inadequate math skills, jobs or other priorities, pace too fast, lack of understanding, bias, no determination, and lack of confidence in learning ability. The project director felt both displaced workers projects attracted some students who were more interested in continuing their unemployment insurance (UI) benefits than in retraining. The counselor mentioned the stress of personal problems which students brought with them to program (family, drug, alcohol) compounded by the the pace of the program.

Those who survived helped themselves by focusing on the new career ahead. Support by classmates, instructors, counselors, and family was also important.

A significantly greater number of people in both programs completed training when they had a working spouse.

People over 40 years of age were at greater risk of withdrawal than those under 40. Participants with the most and least education withdrew.

In comparing displaced workers with students in the regular electronics program and the college population, only one difference emerged. Displaced workers were older than their counterparts in a day electronics class. The difference probably would not have existed with an evening class. They were not significantly older than the general college population.

QUESTION 2: Were students able to absorb the material in the time available?

The project counselor described the program as a 42 week race with no timeouts or reruns. The ones with the stamina - academic, financial, and emotional - made it. Several students expressed a desire to review some of the material they studied. Five of thirteen who completed surveys at the end thought the pace was "good." Seven others thought it was too fast. An instructor in the regular program who taught half of one course with them did not believe their skill level was equivalent to students in the regular classes. He blamed their prior instructor. The displaced workers had equal ability, he thought. The instructor who assumed primary teaching responsibility in about the third module was pleased with their progress by the end of the program (five modules). He thought the length and pace was comparable to a private vocational school like Heald.

QUESTION 3: Did students secure employment?

One month after the program ended, four of eighteen were employed. Wages ranged from $6.00 an hour to $14.00 (average $9.50). In the displaced

worker (DW) drafting program 63% were employed with an average wage of $7.80. Students in the DW electronics program expected to find jobs paying $9.75 to $13.00. Some were not interviewing for jobs which paid significantly less.

QUESTION 4: How effective was this retraining effort?

The jury is still out. Success depends in large measure on how many obtain jobs. Follow-up 60 - 90 days after the end of the program is needed. However, knowledge about retraining was gained. This section presents information on comparisons with other programs, problems encountered, strengths shown, revisions suggested, and opinions on future programs.

Fourteen retraining programs in electronics related field were run for laid-off General Motors workers in the Bay Area. Duration varied from two to six months. Average completion rate 67% with placement rates ranging from zero to 91%. Average wage was $6.87. Under the state extension of UI for retraining which covers many occupations, the average completion rate was 66% with placement rate among those who finished about 22% with an average wage of $7.51.

Approximately 60 people enroll in first year electronics classes at Ohlone College. About 20 enroll in second year classes and nine received A.A. degrees in June, 1984. Eight graduates were contacted.They were all working, seven in related jobs with an average wage of $9.61. Several said "over $10.00", so the average could be considerably higher.

Finding instructors was the major problem for the program. Money was the Number One problem for students. The short start up time created a pressured environment which led to a series of mini-crises with scheduling, assessment, equipment purchase, textbooks, and instructors. Other problems included the personal lives of some of the students, insufficient counseling time planned, lack of funds for tutors, reporting difficulties for admission office due to non-traditional schedule, and need for curriculum revision rather than compression.

Despite problems finding qualified instructors initially, the final instructor was one of the program's major assets. Administrators saw the major benefit or strength of the program as the service to students. 60% indicated they would not have enrolled in college, if this program had not been offered. Most of them are enrolled in regular classes to complete their A.A. degrees. The project allowed the college to pilot a new curriculum and to purchase new equipment which will benefit all students in the electronics department. Resilience of the college support staff was important. Linkages with other community agencies allowed the counselor to refer students who needed more personal counseling to agencies funded by United Way to work with displaced workers.

The project director, his staff, the counselor, and final instructor all deserve praise for their commitment to making the program a success for the students involved.

Administrators, counselors, instructors, and students suggested the following revisions: allow more time to prepare and schedule, select

instructors before program begins, give instructors more time to prepare and coordinate, involve full-time faculty in teaching from outset, enhance pre-screening (aptitude, commitment, financial plan in addition to academic), more math training, revise curriculum, institutionalize, match modules with college schedule, expand counseling support, plan for tutors, invite industry representatives to visit early, schedule more fields trips earlier, plan ahead for financial aid.

Opinions on offering a sequel and on replication were mixed. The upgrade component has been institutionalized, but another entry level program is not planned at this time. The project director is investigating to see if the regular certificate program can be completed in one year. If it is possible, this option will receive more publicity. If not, a revised version of this pilot project might be instituted when the question "Is this the best way to offer it?" has been answered.

The instructor from industry and the original project director thought the college should offer "job training" in this intensive format. "Excelent way for a highly motivated person looking for a second career," commented the instructor. He also said "it fills the gap in educational alternatives for the mature student."

The counselor thinks the community wants "job training" and, therefore the community college should respond. However, he sees adjustments necessary by the college for the effort to succeed. The counselor for DW Drafting, who also has placement responsiblities, expressed other concerns. She sees the largest companies, like Intel and IBM, hiring only the best of the A.A. graduates. She worries about lack of communication skills among displaced workers with less training. She agreed that training offered on an open entry and competency-based format might be better for displaced workers.

The DW Electronics program generated 41.07 ADA with eighteen students completing. One ADA currently equals $2,035. Final cost figures were unavailable when this report was written. Using estimates from budget figures, the program cost approximately $76,462. With equipment purchases unnecessary in the immediate future, the program would probably pay for itself.

Was the program a success based on cost/benefit for the students? If they earn $9.50 with 6% cost of living increase and face 6% inflation for the next ten years, the answer would be "No." However, if they earn $10.50 within a short time which occurs among A.A. graduates, the answer would be a resounding "Yes." In that case, the internal rate of return would be over 20%.

Students in the DW Electronics program had earned an average of $10.76 an hour before training with a range from $5.35 to $15.40. Cost/benefit analysis looks for income gained in relation to cost of training. Positive cost/benefit ratios are more difficult to achieve with displaced workers than with youth, for example, without an earning history. EDD saw an average drop of $2.14 an hour in the jobs obtained by displaced workers after they were laid off. The evaluator used that figure for the sake of analysis and assumed workers could have found jobs for $8.62. The validity of that estimate varies significantly by individual. $8.62 is also more

than some of them earned previously. The numbers do not reflect the personal gains from more education or the possibility of even greater financial gains.

The cost/benefit process is critical, because the workers feel very strongly about earning as much or more than they have in the past. One worker said $11.00 was about the minimum acceptable and the break even point for him is about $10.50. Their satisfaction with the training and even the jobs they will accept depend on the wages. Helping them evaluate their expectations is another issue.

Studies by EDD of displaced workers in California and by SRI International of the Downriver Project showed placement rates were not higher in programs with training than in programs with job search only. Those projects provided short term training, usually around six months.

The training must be long enough to make the displaced workers competitive in a new field. At the same time, it must be short enough to allow them to survive financially during training. Alternative methods of finanical aid and training delivery must be sought. Their immediate economic needs, their expectations, and the jobs they can find without training must be balanced against the wages they can earn in the new occupation.

Retraining is not the answer for all displaced workers. However, millions of workers will be displaced in the near future as technology continues to advance. Many will need and want new skills. Training must be available in a format appropriate for adults with financial responsibilities.

B. Upgrade Training

18 people enrolled in "Introduction to Robotics," a 108 hour 3 unit course from March 5 to June 27, 1984. The course was designed for electronic technicians who wanted to learn about robotics. 12 Hero robots and the accompanying Heathkit texts and manuals were used. Many people applied who were not qualified. A difficult pre-test was designed by a college electronics instructor. It may have scared some applicants away from the course. With those factors, enrollment was not as high as anticipated. Therefore, some people were admitted without pre-screening. The class was composed of two people with master's degrees (physics and industrial engineering), 6 with A.A. degrees in electronics, 1 graduate of a German technical school, and 6 with less than an A.A. degree in electronics. They all worked in that field with experience raning from one to thirty years. 11 completed the program (1 with master's, 5 with A.A., 1 technical, 3 less than A.A.). Three indicated their companies currently use robotics. They all finished.

Generally the students were satisfied with the course. They praised the instructor. Because of the diversity of technical knowledge, he had to present more basic electronics information than he had planned. He recommends defining the target group narrowly. Seven of the students disagreed with the statement that the course was designed for technicans with an A.A. degree.

The students were pleased that a community college was expanding its curriculum and offering a course on current technology. They suggested additional courses on troubleshooting, preparing someone for a job in robotics, more on industrial applications, the business of robotics (economic feasibility and marketing).

The instructor and some students thought the course should be offered in two semesters, because of the amount of material presented. The instructor suggested an advanced course in microprocessors, more programming (assembly language, C, and Pascal), and a humanistic/economics course about the impact of robots in society.

The project director believes advertising of future courses should be more specific. The course has been institutionalized and a new course on the impact of robots is planned. The project director, who is also in charge of tehcnical programs at the college, has designated an instructor to investigate ways to expand the college's robotics program. He particpated in a funded by the local Private Industry Council to develop curriculum to train robot monitors on industry sites.

V. RECOMMENDATIONS

A. Entry Level Displaced Worker Training

The need for retraining is apparent. The need for more effective retraining programs is apparent. A higher percentage of those who retrain should find jobs in their new field. Who will offer it and how is still unclear to this researcher. More study, evaluation, and pilot projects is needed. This program provided a few answers and raised more questions.

When considering format, the economic needs and expectations of the displaced workers must be considered. The jobs they can find without training must be balanced against the wages they can earn in a new occupation. They must receive enough training to be competitive. Investing more money in fewer people should be considered.

Based on this experience, a few suggestions are offered to funding sources and program operators when designing future retraining programs.

1. Funding Sources

   a. Open a Retraining Center to serve the Bay Area and offer competency based vocational training on an open entry-open exit basis.

   b. Extend UI benefits to cover length of training necessary for highly skilled occupations or develop a Retraining Insurance fund to which workers would contribute.

   c. When funding individual projects, plan for more time between award of grant and beginning of classes.

   d. Look for pre-selection of faculty.

e. Conduct long term study and evaluation of retraining.

f. Support testing of competency-based, modular programs.

g. Support use of computer aided instruction.

h. Offer two-year grants to allow pilot projects adequate time for development.

2. Program Operators

a. Assessment

(1). Include individual screening to assess commitment, to financial resources, and expectations as well as academic preparation.

(2). Exclude people who are extremely over-qualified as well as those underqualified, if curriculum is not individualized.

(3). Make sure applicants aware of prevailing wages in new occupation, services available, roles and responsibilities of all parties.

b. Instruction

(1). Seek ways to increase instructor salaries in demand fields

(2). Select instructors before program begins. Involve full-time faculty.

(3). Evaluate instructors in time to change, if necessary.

(4). Redesign curriculum. Compressed is not enough.

(5). Consider competency based, modular curriculum and computer aided instruction to allow individuals to proceed at their own pace.

(6). Prepare teachers to work with displaced workers.

(7). Insure depth of training adequate to meet employer demands and to make graduates competitive.

(8). Include a course on "How to Survive in College".

c. Counseling

(1). Plan for adequate counseling. Someone needs to be available on a full-time basis, even if responsibility shared by a coordinator.

(2). Encourage peer support.

(3). Have linkages to outside counseling, child care, transportation, and housing assistance established.

d. Placement

(1). Increase time spent on job search workshops after classes conclude.

(2). Infuse job search and career development activities into curriculum.

(3). Include job development with job placment assistance.

e. Administration

(1). Assign a coordinator to handle recruitment, selection, daily operations, reporting, placement, follow-up (full-time if a pilot project, part-time otherise)

(2). Offer on a regular basis for ease of operation and incentive for instructors.

(3). Insure good communication between administration, staff throughout the college, counselor, and students to avoid unmet expectations and to promote cooperation.

Educators have an obligation to find more effective retraining methods. Newspapers, magazines, and television feature leaders in business, education, and government stressing the necessity of retraining. People believe them. When they are laid off, the enroll in schools and colleges. Their goal is a job, not an education. Many do not have glowing memories of success in school. Their personal investment is great. Sacrifices by their families are significant. Imagine the disappointment, the sense of failure, if they complete the training despite the difficulties and then can not find a job.... Excellence is imperative.

B. Upgrade Training

To avoid retraining, life long learning must be facilitated and upgrade training is one avenue. Community colleges are the source of most technical training. Their programs must stay current to upgrade the skills of people working in local companies as technology advances and to train future employees. This grant from the Chancellor's Office gave Ohlone College the opportunity to pilot a new curriculum, to add new equipment, and to update its electronics program as a result. The project will continue as an integral part of the curriculum and as a catalyst to additional courses in robotics. Support for these pilot projects should continue and be expanded. Local businesses can contribute more to keep technical programs current - release time for instructors or seminars conducted by their training staff. Working cooperatively to insure a skilled workforce benefits everyone.

EVALUATION REPORT

OHLONE COLLEGE

INVESTMENT IN PEOPLE PROJECT 1983-84

ELECTRONICS/ROBOTICS PROGRAM

I. BACKGROUND

Ohlone College received a grant for $49,323 from the Chancellor's Office of the California Community Colleges to provide entry level training in electronics/robotics for 24 - 30 displaced workers and upgrade training in CAD for 24 electronic technicians who needed to learn this new technology or become displaced themselves. The entry level component was also funded by a contract from the State Job Training Council under the Job Training Partnership Act (JTPA) for $50,000. The project was designed to utilize the combined resources of IIP, JTPA, Ohlone College, and employers.

The college purchased one Hero teaching robot produced by Heathkit and sponsored a demonstration of this system for other community colleges and business several months before this program was designed.

Representatives from Apple Computer, Diablo Systems, General Electric, Hewlett-Packard, and Noel J. Brown Manufacturing were consulted regarding the curriculum, the length of training, and the choice of teaching robots. They recommended more than one thousand hours of training for the displaced workers. The Human Resource Manager of Apple Computer's new plant in Fremont thought the Hero was more appropriate for their needs than other heavier industrial models available. Their plant manufactures the MacIntosh computer and uses automated (robotic) manufacturing extensively.

Retraining displaced workers and upgrading skills to prevent further displacement was important for Ohlone College. Located in Alameda County, it serves the Fremont area which has a unique combination of sunset and sunrise industries. The former General Motors plant is in Fremont. The college had been working with other community organizations to assist laid-off workers for nearly three years. When this project began, the joint venture between Toyota and General Motors had not been finalized. The closed Ford plant is only five miles away. In 1983, 14,358 people in Alameda County had lost their jobs due to plant closures or mass layoffs. Almost 2,000 were people with low skills who had worked in the electronics industry for companies such as Atari, Fairchild, Qume, Osborne, and Victor. At the same time California Business magazine recognized Fremont as the new growth area for Silicon Valley. Xidex built a facility to manufacture floppy disks and hired nearly 250 people in 1984. Other new names include Microsensor Technology, Ferix, Votan, and Omni Technology.

In that setting, Ohlone College proposed to offer intensive retraining

in two high technology fields - CAD drafting and electronics/robotics. The college wanted to provide displaced workers with enough skills to secure good jobs with opportunities for advancement. The workers would complete nearly all the drafting courses required from an Associate of Arts degree. Based on information from employers and good placement records for graduates of the regular A.A. program, the college believed longer training programs in these high technology areas were necessary to adequately train workers for entry into new fields. Similar training programs funded under the special project for General Motors workers or by JTPA averaged 6 - 7 months. Ohlone College had not previously offered retraining in the long, intensive format and wanted to test the concept. This ten month program was longer than any other that had been approved for displaced workers under the special General Motors project or under JTPA locally.

II. PURPOSE OF STUDY

The general purpose of this evaluation is to provide information on the effectiveness of this project's approach to retraining displaced workers and to upgrading the skills of technicians currently working in the field. The information will be used to aid decisionmaking regarding the need for modifications, the desirability of repeating the project, and the value of the project as a model for replication by other colleges.

Primary users of the information gathered from this evaluation will be: 1) the administrators, instructors, counselors, and staff of Ohlone College; and 2) the Chancellor's Office of the California Community Colleges.

III. METHODOLOGY

This program was a pilot project subject to all the trials and errors common to action programs at this stage of their development. Experimental methods of evaluation possible during a model phase were not appropriate in this case. The evaluation component began with the project and ended at its conclusion which precluded a longitudinal approach or even many of the follow-up activities which would have been informative. With these constraints in mind, a user-focused evaluation process was selected. The design was discussed with the Dean of Instruction, project director (original and current), counselor, and instructor in charge of drafting for the college. Their input was important to insure that the design would answer their questions and that the measures would be meaningful to them. The evaluation process agreed upon is described below.

A. Entry Level

The grant proposal outlined the areas of interest for evaluation. To shed light on the effectiveness of the entry level training for displaced workers, answers to the following questions were sought: Were the assessment procedures and remediation sufficient to select students with the best opportunity for success? Were the majority of students able to absorb the material in the time allowed? Did they secure jobs? What do administrators, students, counselors, and instructors think about the effectiveness of the program, problems encountered, advantages, revisions,

and the advisability of offering another similar program?

Input from a variety of sources was sought. Correlations were computed between assessment scores and grade point average (GPA) and between assessment scores and completion/non-completion. Demographics of displaced workers was compared with similar data on students in the regular program. Surveys and, in some cases, interviews were conducted with students, instructors, counselors, and administrators. Information on other retraining programs was gathered. Graduates of Ohlone College's A.A. program were surveyed for placement information. Cost/benefit data was examined. Originally, the evaluator planned to survey employers. The short time between the end of classes and the end of the project precluded this activity.

B. Upgrade Training

This component was designed for technicians working in electronics to learn about robotics. In assessing its effectiveness, answers to the following questions were sought: 1) What level of knowledge did the students bring to the course? 2) With that information, were curriculum adjustments necessary? 3) Were expectations met? 4) Were modifications necessary midway in the program? 5) How did students as technicians evaluate the course content, presentation, depth, and usefulness of the program at the end of of the course? 6) Based on this experience, what changes would the instructor and project director make? 7) Several weeks after the end of the program, how valuable did the students consider the course? What additional courses would they recommend? Have they used the information on their job?

Students were surveyed four times(at the beginning, middle, end, and several weeks after the end of the class). The instructor and project director completed questionnaires and were interviewed. Cost/benefit information was considered.

The evaluator has been with the project since its inception. She wrote the grant proposals which funded the program.

IV. FINDINGS

A. Entry Level Displaced Worker Component

GENERAL INFORMATION: November 9, 1983, 28 displaced workers began retraining to become electronic technicians with an introduction to robotics. 43 weeks later on September 14, 1984, 18 completed the program. With some individual variations, they received 1170 hours of training and earned 45 units of college credit. One month after the conclusion of classes, four were employed. Five women and 23 men began the program. Three women and fifteen men completed. 60 - 70% have enrolled in classes to complete their A.A. degrees.

QUESTION 1: Was the assessment process sufficient to select students with the best opportunity for success?

The assessment process provided a good indicator of who could succeed. High correlations existed between assessment scores and GPA. However, no correlation appeared between assessment scores and completion/non-completion. Other factors than those tested affected retention.

This section of the Evaluation Report will provide a description of the assessment process, data on the correlation between assessment and GPA, findings on correlations between assessment scores and completion/non-completion, information from surveys and interviews on retention and remediation, and a comparison of demographics between displaced workers and students in regular electronics program.

a. Description of Assessment Process

Applicants took three assessment tests and wrote a statement of purpose. The tests consisted of two sections from the TABE (basic reading and math) and the COATS interest inventory. The testing was done at the Fremont Adult School (FAS). College staff administered the interest inventory and FAS staff the academic assessment. FAS was selected as the testing location, because parking was easier for applicants. FAS uses the TABE routinely. It can be administered easily, scored on site, and reported by grade level. COATS was recommended by the director of a job training program at Long Beach City College.

The entire assessment process was a collaborative effort by Ohlone College, FAS, and the Employment Development Department (EDD). FAS also taught a remedial reading class for the displaced worker drafting program. This joint effort was a continuation and expansion of the community cooperative effort to aid displaced workers which began in 1980.

A team (two EDD staff members with extensive experience with training programs, the project director, counselors, proposal writer, and a representative from the Fremont Adult School) reviewed the assessment scores and the counselors' recommendations based on a review of the statements of purpose written by applicants.

More people applied than could be accepted into the program. Two applicants were not recommended for electronics or drafting, because 1) they indicated no preference between the drafting and electronics programs, 2) their interest scores were significantly below the suggested level, and 3) their statements of purpose were vague. Six others were not selected, because of low TABE scores. Three more were not recommended, because of low COATS scores. Two of the applicants with low COATS scores did enroll, but they did not complete the program.

Three or above was the score recommended by the COATS manufacturer. The Long Beach Director suggested 5 as a minimum. Academically, the team believed applicants needed tenth grade reading skills and ninth grade math skills to succeed in the electronics program. People with lower scores were admitted, however, as space permitted. The decision was to select those people who seemed to have the best opportunity to succeed among those eligible for the program.

b. Correlation between assessment scores and GPA

Correlations between (GPA) for completers and their math, reading, interest, math + reading, and math + reading + interest scores were computed using regression analysis.

The highest correlation was between the composite assessment and GPA (r=.77). [NOTE: r has values ranging from -1 to +1. A value of -1 describes a perfect negative correlation. A value of +1 a perfect positive correlation] r = .77 is a high correlation. Correlations for reading + math and math only were also high (r=.66 and .63 respectively). Scores for interest and reading were moderate (r=.47 and .35 respectively). See Appendix 1. Correlations for the drafting program were not as significant, possibly because of the small number who completed.

A lower correlation between reading and GPA than between math and GPA was expected, because most of the students had the minimum reading level recommended and the range was narrow. Except for one foreign born student, the reading scores ranged from 10 to 12.9. In math, they ranged from 8.4 to 12.9.

Only one person had a COATS score below three. Those scores ranged from -1 to 8.

A profile of a successful applicant, academically, did emerge - Math 10.4, Reading 11.8, and Interest 5. These are the mean scores of all the completers in electronics/robotics. Please note that the mean scores, the profile of a successful participant, in the drafting program are almost identical to the mean scores of completers in DW Drafting (Appendix 1).

c. Correlations between assessment scores and completion

Point bi-serial correlations of the assessment scores and the completers/non-completers or persisters/non-persisters were all negative, except for interest. That one was very low. Those results are in Appendix 2. These results do not indicate academic preparation was a disadvantage. The correlations in the electronics program were skewed. Two people with master's degrees and one with a bachelor's degree in related fields enrolled in the program and did not finish.

The admission of overqualified candidates who did not complete exaggerated what probably would have been low correlations between academic and interest scores and completion. In the displaced worker (DW) drafting program, the correlations between the composite assessment and the math assessment scores were moderate (r= .34 and .35 respectively). Other correlations were low. These results reflect that other factors impacted retention more than academic readiness or interest. Surveys and interviews provided insight on those issues.

d. Information from surveys and interviews on retention

The project counselor, director, and instructor believe the primary reason most students withdrew was economic. The counselor believes

finances should have been one of the main topics initially. He also saw difficulties asking people not accustomed to academia to jump in the fast lane and continue that pace for 42 weeks. The original project director also mentioned this factor. The instructor said, "In many ways this sort of program can be like trying to take a sip of water at a fire hydrant."

No one left the program for purely academic reasons. The counselor also mentioned the impact of family, drug, and alcohol problems among some of the students.

In May, 24 students completed questionnaires. When asked why they thought other students dropped out, they responded: money problems (10), instructors in first two modules (10), inadequate math skills (4), jobs or other priorities (4), pace too fast (3), lack of understanding (1), bias (1), no determination (1), lack of confidence in learning ability (1).

In August, money was cited most often as a problem by students who completed surveys (8/13). The pain of the poor instructors at the beginning seemed to have faded as two mentioned this deficiency. Other reasons for dropping included: pace (3), lack of interest (2), "freeloaders" or "enrolled for unemployment insurance (UI) benefits" (2), lack of confidence (1), and lack of math and study skills (1).

Math was mentioned by several students, the counselor, and the instructor. Because of difficulty finding an instructor, students had four weeks to learn algebra. Fortunately, the instructor was excellent, according to student surveys. The electronics instructor called math "the descriptive language of electronics." He recommended "a lot more" math training and a selection process which "filters students with a marginal math background." 80% of the students wanted more math training in May, 54% in August.

While the project director saw financial instability as the biggest factor in retention, he also saw a lack of commitment among some students. The program drew "a lot of students interested in benefits," he said. At the same time, many students sacrificed greatly to complete their training.

Students and the counselor credited Alfie Gilbert, the instructor who taught more than half the electronics classes, with "saving" the program after initial difficulties finding good instructors.

When asked how they helped themselves complete the program, nine students indicated they remembered their goal - anew career. Two mentioned help from other students ("Some of us helped each other during periods of depression - just letting each other know it would get better."). Others mentioned instructors (including Clive Taylor, algebra), and family.

When asked about people or circumstances that helped them, they listed the new instructor (6), Taylor (1), other students (4), family (3), counselor Jack Peters (2), and the college (1).

As mentioned, money was listed as a major factor by many. Students said they survived financially through a variety of means: spouse working (7), unemployment insurance (8), loans (4), savings (4), and working part-time (2). Of course, many listed a combination of sources. 54% of the

completers indicated a working spouse.

Among those who did not complete, only one indicated they were not the primary wage earner. The data does not indicate whether or not their spouse or a significant other was working. Even if they were employed, many families base their financial commitments on two incomes. Therefore, one income may not be sufficient to make mortgage payments, etc. However, the existence of another income in the family seems to have made a difference. Based on information from surveys and program data, please observe:

Figure 1a. Primary Wage Earner Status

	Completers	Non-Completers	
o DW Electronics/robotics			
Primary Wage Earner	6	8	14
Other Income Present	7	1	8
	13	9	
o Displaced Worker Program (Drafting + Electronics)			
Primary Wage Earner	7	26	
Other Income Present	13	2	
	20	28	

In the drafting program, the difference was more pronounced. Six (86%) of those who completed (based on seven completed surveys) had another income present in the family. Considering the whole displaced worker program, 21% of those who said they were primary wage earners completed the program - 79% did not. 87% who persisted said they were not primary wage earners or indicated a working spouse. 13% who said they were not the primary wage earners dropped out.

A chi square test of significance with a correction for the small number was applied to confirm the apparent difference (actually to test a null hypothesis that there was no difference in the completion rates of primary wage earners and non-primary wage earners). $x2 = 15.58$ indicated a significant difference. The critical ratio required for significance at the 1% level was 6.64. x2 was figured for the DW program as a whole.

Many of the displaced workers identified themselves as Primary Wage Earners when they completed program data sheets, even though they were currently unemployed. The employment status of spouses was not requested. A significant difference in completion rates still exists when program data

is used and spousal income information from the survey is not considered.

Figure 1b. Primary Wage Earner Program Data

	Completer	Non-Completer	
Primary Wage Earner	19	26	45
Non-Primary Wage Earner	7	2	9
	26	28	54

x^2 = 5.36 which is a significant difference at the 5% level (3.84 required)

The program consisted of five modules each one approximately nine weeks long. Three students dropped in Module 1, two in Module 2, 2 in Module 3, and 2 in Module 4. The later drops occurred when unemployment insurance ended.

People over 40 years of age seemed to be at higher risk than younger people. Age information was available on 24 students. Ten were 40 or older. Five completed. Among those under 40, 85.7% completed. Among those over 40, 50% completed.

Average previous education for persisters was 12.4, for non-persisters 13.6. The highest and lowest dropped out. One student enrolled who had not finished high school. He did not complete.

The ethnic breakdown of persisters was Asian/Pacific Islander was 6% (1), 22% Hispanic (4), 11% Black (2), and 61% White (11). The class began with 7% Asian/Pacific Islander (2), 7% Black (2), 18% Hispanic (5), and 68% White (19). See Appendix 3.

e. Comparison with regular electronics program

Initially a comparison of grades and demographics was planned. However, the evaluator decided against a comparison of grades. One instructor did not teach the same class in both settings. Differences in grading could not be assessed.

A study of age, education, ethnic background, and gender was made to see how the displaced worker group compared with students in a comparison class, the drafting program, the general college population, and the labor force.

AGE: The mean age for displaced workers in the electronics program was 37 years and 26 years in the comparison class (Electronics 150A, Fall 1983). Using the null hypothesis that no difference existed between the mean age of the DW Electronics students and students in the comparison class, a t-test for groups

with small and unequal numbers was computed. The displaced workers in the DW electronics were significantly older than the students in the comparison class. However, there was no significant difference in the ages of the DW electronics program and the general college population. The median age for DW electronics was 35.5, for the comparison class 24, and for the college 24.49. Using a sign test for two independent samples with Yates correction for continuity, there was a significant difference in the median ages of the comparison classes. This difference was not present in DW Drafting. See Appendix 4 for more details.

EDUCATION: Displaced workers in the electronics program had a mean educational level of 12.8 (grades completed). The range was from 11 to 17. The mean in the comparison class was 12.7 with a range from 12 to 14. Using a t-test for the significance of difference between the means of small samples, no significant difference existed. The displaced workers in the drafting program did have significantly less prior education than students in their comparison class. Appendix 5 has details.

It also shows the education level of U.S. labor force, the displaced worker program, and the college population. College data did not differentiate between grade levels below college. The majority of the displaced workers seem appropriate as freshman based on prior education.

ETHNIC: No significant difference existed between the displaced worker program, the college population, or Alameda County when race or ethnic background is considered on a white or non-white basis. See Appendix 3. Percentage of blacks was twice as large in the displaced worker program. Asian participation was less than half compared to the regular electronics program and the comparison class. The college has a relatively large population of refugees and foreign students, who do not qualify as displaced workers.

GENDER: The DW electronics program began with 23 men and 5 women. It concluded with 15 men and 3 women. The comparison class had 2 women and 22 men. The regular electronics program in 1982-83 had 145 men and 19 women. Fewer women enrolled in the DW program than are enrolled in the college as whole. However, the percentages are close when compared with the vocational programs and with the labor force in Alameda County. See Appendix 6.

QUESTION 2. Were students able to absorb the material in the time available?

The instructor thought the length and pace was comparable to other vocational programs such as Heald or Bay Valley. Five of the 13 students who completed the final questionnaire thought the length and pace were "good," in their words. Seven others thought it was too fast or that they could have absorbed more if it had not been so intense. Another said "tough, but manageable." They completed 45 units of coursework in ten months. 30 is a normal load in nine months. Several of the students and

the instructor believe the curriculum needs to be redesigned. Their suggestions will be included in the section on Program Effectiveness. One instructor who teaches in the regular electronics program took over a class from an instructor who did not perform as expected. In his opinion, the displaced workers were not at the same level of knowledge as students in his regular classes, although the displaced workers showed equal ability. The overall GPA in the DW electronics program was 3.0 which is a B average.

QUESTION 3. Did students secure employment?

One month after classes ended, 4 of the 18 who finished were employed (22%). Wages were $6, $7, $11, and $14 an hour which is an average of $9.50. In the DW Drafting program the placement rate was 63% (5/8) with average wage of $7.80.

The students in the DW electronics program expected higher wages than those in the DW Drafting program. Several of the electronics graduates mentioned expectations of $9.75 to $13.00. They had seen those figures at the beginning of their training. The numbers were wages received by graduates from Ohlone College's A.A. program. Some of the displaced workers were unwilling to consider jobs at that time which were significantly less. The husband or significant other of one graduate was reluctant to admit one of the women was working for $7.00 an hour. He was insistent she was looking for another job. The previous wages of students in DW electronics had been $10.15 an hour ($10.76 among completers) which is approximately $2.00 an hour more than the average wage among DW Drafting students.

QUESTION 4. How effective was this retraining effort?

The jury is still out. Success depends in large measure upon how many secure jobs. Additional follow-up is needed to find out how many are employed 60 or 90 days after the conclusion of the program. The average wage among those with jobs is higher than the average wage of graduates from shorter programs. The average wage is comparable to A.A. graduates, except that the low side of the range is $3.00 per hour lower. Most of the displaced workers are continuing their education which is another positive. In addition, this pilot project generated ideas on how to improve this retraining model and others.

This section will compare this project with other retraining efforts and summarize feedback on problems, strengths, and suggestions for improvement. Cost/benefit figures will be examined. Opinions expressed by administrators, counselors, instructors, and students on offering a similar program in the future at Ohlone College or other colleges will be related.

a. Comparison with shorter and longer training programs

The evaluator wanted to see if longer training, and presumably higher skill than acquired in a shorter program, would result in higher placement and higher wages. A literature search of ERIC and educational publications did not find similar studies for comparison. Data from the Employment Development Department on displaced worker programs in the Bay Area and

statewide were available. The "Report to the Legislature on the Investment in People Program 1982-83" published by the Chancellor's Office of the California Community Colleges said some districts provided percentages of employment or used descriptive words like "most" or the "majority" of completers were employed. Employment figures by program were unavailable for that program as a result. Data collected has been summarized in Figure 2 on the next page.

A.A. graduates as expected had the highest wages and highest placement rates. An EDD employee commented that the shorter training allowed people to gain entry and to continue training at night, if they wished to advance. Graduates from the Ohlone displaced worker project under study did secure jobs with a higher average wage than graduates from the shorter programs and almost equal to the A.A. graduates. However, it should be noted that the lowest wage among A.A. graduates was $9.61 and it was $6.00 among the DW electronics students. Nine people received A.A. degrees in electronics from Ohlone College in June, 1984. Eight were contacted and all eight were working, seven in training related jobs (88%). Their average wage was at least $9.89 with the lowest $9.61. Six indicated "More than $10.00 an hour." Note the completion rate for the A.A. program. Many students take jobs before they graduate. Others do not finish for the variety of reasons which affect all training programs (need for employment, lack of commitment, lack of aptitude, personal reasons, etc.). Is the retention rate lower as the length of the program increases? More study is needed to answer that question.

The data collected did not provide a clear picture of the optimum length and content of retraining in this occupation. Placement rates among the shorter comparison programs ranged from 0 to 91%. The average completion rate was 67%, which is close to the Ohlone College program. Placement rate in the program under study is the same as the rate recorded under SB 1115 and SB 13. The short time after completion for collection of placement data is a major factor in all the figures reported.

Follow-up with employers of graduates from the Ohlone College and programs with a high placement rate is needed. Their feedback is important to evaluate the strengths and weaknesses of the training. With that information, curriculum from the strong programs should be reviewed and a composite developed. This study originally planned to contact employers of the Ohlone College displaced workers. Most of them have been employed only a few weeks, many a few days. The evaluator did not believe there was adequate time for the employers to evaluate them.

The graduates and non-persisters should also be contacted to determine the long-term impacts of retraining and the strengths/weaknesses of the retraining programs from their perspective. What happened to those without retraining? With retraining?

Figure 2. PROGRAM COMPARISONS

PROGRAM	LENGTH	# START	# END	%	# PLACED TRAINING RELATED	% START	% END	AVERAGE WAGE
o Electronics Displaced Workers*								
TTI	6 mos.	23	11	48%	10	43%	91%	$8.63
Merritt CC	6 mos.	20	11	55%	4	20%	36%	8.38
San Jose CC	6 mos.	81	61	75%	16	20%	26%	7.35
Vallecitos	7 mos.	17	14	82%	3	18%	21%	6.63
ATC	7 mos.	25	20	80%	7	28%	35%	7.50
CDI	6 mos.	34	23	68%	6	18%	26%	7.71
East Bay Sk.	6 mos.	29	13	45%	2	7%	15%	3.68
Skyline CC	2 mos.	24	15	63%	3	13%	20%	6.90
Worldwide	5 mos.	23	12	52%	7	30%	58%	6.50
East Bay Sk.	7 mos.	34	22	65%	1	3%	5%	6.50
Skyline CC	2 mos.	11	11	100%	4	36%	36%	6.16
Foothill CC	5 mos.	20	17	85%	2	10%	12%	6.25
San Jose CC	2 mos.	11	7	64%	0	-	-	-
Canada CC	4 mos.	16	12	75%	1	6%	8%	7.00
o Ohlone DW	10 mos.	28	18	64%	4	14%	22%	9.50
o A.A. Electronics Ohlone CC	18 mos.**	60	8	13%	7	12%	88%	9.89
o Statewide Retraining Statistics (various occupations)								
SB 1115***	variety	795	532	67%	113	14%	21%	unknown
SB 13****	variety	306	190	62%	41	13%	22%	$ 7.51

* These programs were for laid-off General Motors workers and covered a variety of electronics occupations from computer repair to telecommunications. One of the East Bay Skills Center programs was for Assembly. 25% (93) of the participants were recalled by GM, some during and some after completing training.

** A.A. program 2 years, but 18 months actual training time. 9 people graduated with A.A. degrees in 1984. 8 contacted in survey.

***SB 1115 state law allowing people to collect unemployment insurance benefits while retraining. 1,839 in training 10/1/82-9/30/83. 795 responded to survey. 62% of 1,839 affected by plant closures. Source: Displaced Worker Evaluation Report prepared November, 1983 by State Employment Development Department. Follow-up was 30 days after program completion.

**** SB 13 is a 13 week extension of UI benefits above. 1,460 clients and 91% from plant closures during same period. 306 responded to the survey. Average wage rate derived from 163 survey responses. Unclear whether from both programs or one. Average prior wage was $9.78. Same source as above.

b. Problems encountered in DW electronics/robotics program

"Finding instructors #1, all the rest 55th," said the project director. The initial project director, students, and the project counselor all agreed. This problem was an issue from the beginning of the project and was not resolved until the third module. From the date the college was notified it had been awarded the IIP grant, four - five weeks were available before classes were due to begin. Based on the end date for funding and the amount of training the College believed was necessary to provide in this occupation, the start date could not be delayed. Initially, the College wanted to hire one full-time instructor to work with the students throughout their training. A full-time position required adherence to affirmative procedures. That process took longer than the time available. The program began with part-time instructors. In addition, finding a qualified person (minimum of a Bachelor's degree and preferably a master's degree with industry experience) who was willing to teach for approximately $23,000 - $25,000 a year or $19.50 an hour was a major obstacle. The search also began in October when teachers are usually committed. There was no guarantee the program would be continued or that the person could become a regular faculty member as an incentive. After several instructors were tried and encouraged to leave, a man with extensive background who had recently sold his electronics company agreed to assume the teaching responsibilities.

Several students mentioned the importance of finding instructors who could handle the intensive format. Please note that "instructors" (Alfie Gilbert and Clive Taylor) was listed as one of the program's major strengths as well as its major problem by students.

The short time for implementation created on-going problems in other areas - class room scheduling, textbooks, equipment, and pre-screening. Funds for books were underbudgeted which required shifting of funds earmarked to cover administrative costs. Books and supplies for both the drafting and electronics programs cost $20,000, twice the original estimate.

The project counselor believed the #1 problem for students was finances. The project director saw lack of money as greatest factor affecting retention. It was the second program weakness cited most often by students (instructors first). The counselor held a special financial aid workshop for them. Several took out student loans. They believe unemployment insurance benefits should have lasted for the duration of training. When the severity of finanical needs became apparent, it took a long time to arrange financial aid or student loans for those who were eligible. The delay seemed to arise from the requirements of the process. One mentioned lack of eligibility, because of the previous year's income.

Some of the students had difficult family problems. including a few cases of alcohol and drug abuse. Helping them took significantly more counseling time than was anticipated. The manner of handling those problems by students also created more crises than seems to occur in regular classes. However, the issue of "disruptive" students was not as great in the DW electronics program as it was in DW Drafting. The students in DW electronics were older, had more education, and had held higher paying jobs than the displaced workers in DW drafting. How important those

factors were compared to just the "luck of the draw" when working with small samples is not clear. Displaced workers do seem to be different from displaced homemakers, another re-entry population the college began serving earlier. Displaced homemakers generally do not march into a Dean's office or call the college President when they become disgruntled. Displaced workers in DW Drafting used this approach with some regularity. The students in DW electronics were outspoken about their dissatisfactions. Many displaced workers have worked in adversarial environments where grievances, for example, are commonplace.

Both the counselor and the project director believe more counseling time should have been designed into the program. Most of the students brought difficult life problems with them compounded by the pressure of the fast pace and technical nature of the training. The project counselor had full-time responsibilties for the college in addition to her role with the program. Because he was easily accessible on campus, students contacted him regularly and usually without advance planning. The readily available support was good for the students, but the counselor gave more hours than he was compensated for and the added hours plus the nature of the problems added to the strain of the program.

Funds had not been allocated for tutors. Nor were sufficient tutors available at the times these students were out of class.

Students and the instructor thought the curriculum needed to be revised for the intensive format. They recommended numerous modifications. Overall the instructor believes use of microcomputers for computer-aided-instruction should be used to allow students to proceed at their own pace. He and the counselor both believe the curriculum should be competency-based and modular. Consensus was that the Survey of Electronics class be dropped. They felt some of the math was inappropriate and the time for math was too short. They wanted more time devoted to digital, microcomputers, and robotics. The instructor also suggested inclusion of computer literacy, how to graph data, and how to use a calculator.

Several sources mentioned lack of communication between college administrators and staff. Staff did not seem aware of the intentions and purpose behind the project which might have made the activities necessary beyond standard operating procedure less troublesome. Comments like "thorn in the side" and "more trouble than it is worth" were reported. Difficulties with books, keys, parking places, and reports were mentioned. All sources praised the project director and his staff for their helpfulness. The lack of belonging or ownership may also be seen in the lack of a ceremony or celebration of any size to commemorate the end of the program.

The Admissions office found administrative support difficult for two basic reasons: 1) the college computer system did not tally and compute positive attendance, so it had to be counted manually; and 2) the beginning and end dates of the modules did not match the normal college schedule; therefore, it did not match the computer programming or the report format required by the state.

The Employment Development Department had agreed to provide the job search training without cost to the project. However, during the course of

the project EDD incurred budget cuts which prevented them from fulfilling their commitment. A former EDD employee was hired with project funds for that purpose (another additional expense within a program which was tightly budgeted originally). The quality of the workshops is another issue. One student said they were "not at all helpful," four "not very helpful," and seven " helpful." The workshop leader had been accustomed to doing four day intensive sessions. This format was one morning a week for four weeks. She remarked on the difference in response from this group. She blamed the format. She mentioned the negative attitude of one student and the non-conformist stance of another. All the other students were "highly motivated to succeed." The workshops contained students from both displaced worker programs and were held during the last month of the project. She said the students were desperate to finish projects and felt conflict attending the sessions.

c. Strengths of DW Electronics/robotics

As mentioned earlier, despite the problems with some instructors, students (9/13) mentioned instructors as a strength. One called Alfie Gilbert "one of the great teachers of all times." They also listed helpful counselors (2 in August and 7 in May), algebra class, class unity (1), job search program (1), and general knowledge of electronics (1).

Administrators saw the major strengths or benefits of the program as providing a service to students - taking people at varied levels and "pulling almost 30 students through" (speaking of both drafting and electronics). The program also allowed the college to pilot a new curriculum and institutionalize it. The upgrade portion of both the CAD and electronics/robotics will continue. The resilience of the college support staff was seen as a major strength. The project provided funds to purchase robotic equipment which will benefit the entire electronics program.

60 - 70% of the displaced workers are continuing their education. 60% said in May they would not have enrolled in a regular college vocational program if this project has not been offered.

Linkages with other programs in the community allowed the counselor to refer students who needed more personal counselling to agencies funded by United Way to work with displaced workers.

The job search workshop leader was impressed with the professional attitude of the drafting and electronics students toward their work. "Their desire for achievement speaks well of the technical instructors," she said.

The length and pace was a strength and a weakness. It gave students time to learn more skills in an occupation where employers standards continue to increase. Most students would not have enrolled in a regular program. They wanted intensive training. Only two suggested lengthening the program. The weakness was the pressure it created. Financially it was difficult to survive that long for people who had been employed full-time. Unemployment insurance does not last that long. Of course, many had been collecting UI for some weeks. The amount of UI available to individuals

varied significantly.

The project counselor described the pace vividly. He said the program was like starting a 42 week race. The students could not stop and retake subjects they did not understand thoroughly. There were no breaks. Those without the stamina - academic, financial, emotional, physical - dropped out.

The project director, his staff, the counselor, and final instructional team deserve praise for their commitment to making the program a success for the students involved. The project director was assigned this responsibility several months into the project. He made difficult decisions regarding instructors quickly, handled the required paperwork, and quieted students, and organized the project members into a team.

d. Revisions recommended for sequels

Based on the problems encountered, the following revisions were suggested by administrators, counselors, instructors, and students:

More time to prepare and schedule
Select instructors before program begins
More time for instructors to prepare and coordinate
Involve full-time faculty from outset
Enhance pre-screening (aptitude, commitment, financial plan)
More math training
Revise curriculum - redesign rather than condense
Institutionalize
Have dates match college schedule (i.e. 2 nine-week modules within a semester)
Expand counseling support
List qualified tutors available when students are
Provide administrative assistant or project director for supervising administrator
Provide funds for tutors
Early visitations by industry representatives
Field trips
Plan ahead for financial aid

e. Opinions on offering a sequel at Ohlone College

Opinions were mixed. The upgrade is established in the evening program. From an administrator's view, the entry level training is a different story. The project director said "looking back it was not too bad. Some periods were gross." An additional burden not mentioned earlier was the amount of "paper" required by the JTPA portion of the project funding. If all the requirements had been known in advance, those tasks would have been easier. JTPA was new when this project began. Regulations and reporting requirements were being developed. Pilot projects require space and organizational adjustments which can be handled more easily when a program is institutionalized. On the positive side, pilot projects allow colleges to test new curriculum. While the project director has not set a

goal of setting up "twelve more projects like this one," he is looking at existing certificate programs to see if they can in reality be completed in one year. If yes, it can be publicized more. If not, a program like this pilot project might be institutionalized when the question "Is this the best way to offer it?" has been answered.

The instructor and the original project director thought Ohlone College should offer "job training" in this intensive format. They believe that, for those who can handle it, this type of training is an excellent way for a "highly motivated person who is looking for a second career." The instructor said, "It fills the gap in educational alternatives available to the mature student."

The counselor had mixed feelings. He sees "job training" as something the community wants and, therefore, something the college should offer. The college must be willing to adjust or the program will not succeed. He sees value in taking classes to the worksite and in competency based instruction, if flexible enough. He reinforced the need for established instructors before a program begins.

The counselor for DW drafting also expressed concern. As someone who regularly deals with placement is that major companies, such as Intel or IBM, are looking for the cream of the crop. They usually interview only the best of the A.A. candidates. She questioned how competitive the students who lacked good communication skills would be in a job interview. She mentioned several dissplaced workers who dropped out as examples. Those skills can be developed through the general education courses or simply through the process of education. She thought the program might be more effective if it was open entry - open exit and competency based, so people could proceed at their own pace. More follow-up is needed on placement in DW electronics to evaluate the validity of her concern and its ramifications for future retraining programs in electronics.

Students offered many suggestions for improving the program as mentioned earlier. Two added comments: "Once the bugs were out of the course, it was time well spent" and "This has been an experience I will never forget and where I learn a lot. If I had it to do over again, I would."

When considering whether or not to offer a program, the cost/benefit of that effort should be considered. The model used in this report was developed by the State Board of Vocational and Technical Education, State of Education. Cost-benefit measures are computed by comparing the costs of training with future earnings after training. The income students could have earned if they had not been training is added to the costs of training.

Training costs were estimated based on the budget with the equipment costs spread over a four year period. The project cost approximately $76,462. The cost per completer was approximately $3,970.

Student opportunity costs were computed with the following facts in mind. In the DW Electronics program, the mean wage before training among completers was $10.76 an hour with a range from $5.35 to $15.40. EDD's Evaluation Report saw an average drop in wages of $2.14 per hour.

Therefore, in figuring the income a student might have earned, the writer assumed students could have obtained jobs averaging $8.62 without training. The student opportunity cost per person was $14,940 for the ten month program.

The average starting wage after the program was $9.50. Based on information provided by a Vice-President and Manager of First Interstate Bank, an annual income growth figure of 5% and an annual discount rate for inflation of 6% were selected. These figures will be used to estimate the present value of increased income for a ten year period. Since inflation is the Bay Area during the past ten years has fluctuated from 15% to .08%, even the word "estimate" sounds presumptious. Nonetheless, the resulting cost-benefit ratio gives a sense of the program's worth.

[Note: The pre-program average wage for completers was $10.76. With an average post-program wage of $9.50, the loss immediately after the program is $1.26 compared to an average loss of $2.14 for most displaced workers.]

If the students received only 6% wage increases and faced 6% inflation, the present value of their increased income ($9.50 hourly wage in the first year) would be $17,321 after ten years. In that case, the program would show a $1,589 loss with a cost/benefit ratio of .92. However, consider the cost/benefit if their average wage was $10.50, which it could be in a short time based on the experience of A.A. graduates. In that case, the present value of increased income after ten years would be approximately $36,906. In that case the cost/benefit ratio would be 1.95. The benefits of the program would be nearly twice as great as the costs. $1 an hour makes a difference of $19,585 in ten years.

The Internal Rate of Return is figured by dividing the cost per completer by the increased income in the first year considering the growth and discount rates. Internal rate of Return provides a return on investment figure to allow comparison of this investment in people with an investment at the current interest rate for money. At a cost of $18,910 per completer (including estimated lost income) and a first year income increase of $1,836 ($9.50 compared to $8.62 without training), the internal rate of return with 6% income growth rate over ten years is 4-5%. However, if the hourly wage was $10.50, the increased annual income would be $3,912. The internal rate of return with a 5% growth rate would be over 20%.

DW Electronics generated 41.07 ADA based on positive attendance, reported by the Admissions Office. Final cost figures were unavailable when this report was written. Using the estimate above, it appears a retraining program could pay for itself.

The students understood this economic aspect of their training intuitively. One man indicated $11 was the minimum wage he felt was appropriate. Around $10 is the break even point for these students. Of course, these numbers are estimates. They vary significantly by individual. The process assumes they could find jobs with an average wage of $8.62. The numbers do not reflect the personal value of more education or the possibility of even greater financial gains.

How does one put a dollar value on individual growth? One man in the program had been a high school dropout. At some time he earned his G.E.D.

Later he enrolled in college and dropped out. In this program, he was an A student and one of the first to become employed. Previously he earned $15 an hour. His new starting wage was $11, but the company believes he has a bright future with them. He enrolled in more classes to complete his A.A. and plans to continue until he has a bachelor's degree in engineering.

f. Opinions on replication by other community colleges

Not as originally designed. However, if program planners benefit from the lessons learned and the suggested revisions are incorporated into a retraining program, implementation of what has been called a "good idea" could have better results.

Retraining has been called the major challenge of the future by writers such as John Naisbett in his book Megatrends. As one administrator said, "It is at the heart of the mission of the community colleges to provide responsive occupational education programs for training and retraining." He added that the needs of the displaced workers are not met by traditional programs, because their economic needs are "intensive ones". This pilot project was one effort to find out how the educational system can repond to those needs. Remember, 60% of the students surveyed in May said they would not have enrolled in community college, if this intensive program had not been offered.

A search of the literature found many articles talking about the need for retraining. No evaluations or models of successful programs in high technology occupations for displaced workers at community colleges were found. According to Malcolm Knowles, Holland College on Prince Edward Island in Canada offers 26 vocational programs which are competency based and modular. This format needs investigation.

Community colleges have been retraining people since their inception. Some displaced workers have found their way through the regular system. The evaluator found one former GM worker among the June, 1984 A.A. graduates in electronics. He had worked as an electronic assembler during the day and went to school four nights a week. Most of the displaced workers in this project could not have maintained that pace. It would have been even more difficult for a single parent. He was disappointed with his current wage of $9.75, because he had hoped to exceed his former wage within three years of being laid off. His potential for future earnings is much higher. The average starting wage for graduates of the six month retraining programs in electronics for former GM employees was approximately $6.75. The amount of training and the quality of training is reflected in wages. The question then becomes: How much training is enough? It varies considerably with occupation. In high technology, employer demands are increasing.

In talking with the displaced workers in the electronics program and with former GM workers, the evaluator has been struck with the absolute determination not to lose too much in wages. The current placement rate in the DW Electronics/robotics program is due, in part, to students seeking jobs which pay $9.75 to $12.00 an hour. $11.00 is considered "O.K., as a beginning." Helping them to acquire skills which allow them to compete for jobs at the pay level to which they have become accustomed is a major

challenge. Whether or not they should adjust their expectations - and for how long - is another issue, but one which must be handled before the workers feel committed to retraining and satisfied with the outcome.

Study on the long term impacts of retraining and of not retraining is needed. Retraining is obviously not the answer for all displaced workers. The EDD Evaluation said the placement rate for programs where retraining was an integral part of the project was 25%. The reemployment in other projects was 42%. A study of the Downriver Project conduced by SRI International for the Department of Labor showed that training plus job search produced no better results than job search alone. However, those programs all had short term training. In what occupations and in what depth must training be offered for displaced workers to truly benefit? How do they survive financially while they study?

B. Upgrade Training

GENERAL INFORMATION: 18 people enrolled in "Introduction to Robotics" which was offered Monday and Wednesday evenings March 5 - June 27, 1984. The class was 108 hours long and carried three units of credit. Students were given the option of enrolling in another half unit class for additional time to work on their final project. 11 people completed. The program expected an enrollment of 24. 12 Heathkit robots were used in conjunction with the Heathkit textbook and manual.

QUESTION 1: What level of knowledge did the students bring to the course?

Applicants were given a background sheet and a pre-test to determine their readiness for the program. The pre-test was designed by the college instructor for second year electronics classes. 14 took the pre-test. A few started the test and did not complete it.

Of the 18 who enrolled, two had Master's degrees (Physics and Industrial Engineering), six had A.A. degrees in Electronics, one graduated from a German technical school, and six had less than an A.A. degree. All worked in the electronics field. Job titles included Technical Support Manager, NC Maintenance Technician, Equipment Engineering Service Technician, Physicist, Electronic Technician (4), Owner of a consumer electronics company, Industrial Electrician, NC Technician, Assembler II, Industrial Engineer, Consultant Engineer, and Technical Associate. Three worked for companies currently using robotics. Five others indicated their companies were considering their use. Average number of years in the field was 9.2 with a range from 1 to 30. Two had taken other classes about robotics, one industrial and one at San Jose State University.

Those who persisted included: 1 with a master's degree, 5 with A.A. degrees, 1 from technical school, and 3 with less than an A.A. Everyone who said their company was using robotics completed.

QUESTION 2: With that information, were curriculum adjustments necessary?

The range of knowledge was great. The instructor tried to keep everyone, "probably too hard" he said. He believed he had to adjust too much on the low end.

QUESTION 3: Were expectations met?

Expectations varied as much as the educational background. Reasons for enrolling included: exposure to fundamentals of robotics (4), technical training, get recognized training before use becomes widespread, learn industrial electronics, explore marketing potential, and learn job skills. They expected: basic information robotic fundamentals (3), expand career in area of robotics, interface of robotics with electronics, practical base for robotics and use, hand on experience in programming and circuit analysis, and fundamentals of operation and maintenance.

Publicity said the training program would include: Robot Fundamentals, AC and Fluidic Power, DC Power and Positioning, Microprocessor Fundamentals, Introduction to Programming Principles, Data Acquisition (sensors), Data Handling and Conversion, Voice Synthesis, Interfacing, and Industrial Robot Applications. Prerequisite was "Current Employment in Electronics Industry."

Halfway through the course seven people completed questionnaires. The average reaction was that their expectations were generally being met (6.9 on a scale of 1 to 10 with 10 the nighest and scores from 4 to 10). Unmet expectations included lack of troubleshooting, desire for more in-depth study, and more ifnormation on application of robots in industry. Two students indicated it was too basic. Because specific electronic background not required, the class was forced to "step back." Two mentioned lack of time for the amount of material.

In the same survey four praised the instructor. Also lauded was the program as a whole, the textbook, the tour of FMC, flexibility of schedule, broad view of robots, extra lab time for final projects, learning the language of robotics and new microprocessor languages.

QUESTION 4: Were modifications necessary midway in the program?

Adjustments had been made: more time on basics than planned, extra lab time for projects, and tour of FMC.

QUESTION 5: How did students as technicians evaluate the course content, presentation, depth, and usefulness at the end of the course?

When asked if they thought the course was designed for people with at least an A.A. degree, the students (7) generally disagreed. On a scale from 1 to 10 (Strongly Disagree 1 to Strongly Agree 10), the mean response was 3.9 with scores from 1 to 6. They also believed, based on their background, the course content was "About Right" bordering on "Too

Elementary" (Mean = 4.3 with 1 Too Elementary and 10 Too Technical). 57% indicated they thought the course was designed for an electronics student with no industry experience. No one said "More than an A.A."

Most believed the course was too short for the material presented. They all thought the Hero robot and Heathkit text were useful. Divergence of opinion appeared in response to a question on the usefulness of the course to their career. Two marked "Very Useful," one "Useful," thwo "Little Use," and one "Useless." When asked if they would recommend the course to a friend, two said Yes, two No, and two Maybe.

Comments included: "Overall excellent - could easily be two semesters", "Good instructor", "Additional class on troubleshooting and maintenance", "offer class pass/fail", "waste of time for an experienced tech - should be part of A.S. program or for non-technical people," and "couldn't prepare someone for a job - actual exposure to robot was good."

Suggestions for improvement from students: should contain more about what robotics is all about - sensors, flexibility, and mobility, more industrial electronics and control circuits for high current applications, business of robotics - economic feasibility and marketing, more sensors, industrial applications, more real world (2), more on troubleshooting (2), and a course to prepare someone for a job in robotics, and better advertising.

QUESTION 6: Based on this experience what changes would the instructor and project director make?

The audience or level of student needs to be defined more narrowly and then the course needs to be focused accordingly. According to the instructor, if the goal is to help with employment, the course should be shifted up.

The project director said the advertising must be more specific, more extensive, and with more lead time.

The pre-test should be based on the contents of the course. In this pilot project, it may have screened out more people than necessary. Some people did apply with no electronics background and they appropriately discouraged. However, sufficient numbers were turned away that others were admitted without screening when enrollment did not meet expectations and time did not permit further outreach.

The instructors thought pre-requisites should include Ohm's law, other basics, and probably microprocessors.

In future programs he would assume more knowledge in basic microprocessors and circuits. He would save six hours of lecture for in-depth discussion of interfacing and "real life robots." He would also expand interfacing, servos, resolvers, motors, and hydraulics/power devices.

As sequels, the instructor suggested an advance course on microprocessors, more programming (assembly language, C, and Pascal), and a

human/economics course exploring the impact of robots on our world.

He recommends purchase of robot parts and sub assemblies for practical training on main components. As a teaching device, Hero was "good." The Heathkit text was a good guide, but he would not follow it so closely again.

Difficulties arose when the program crossed traditional college schedule (parking permits expire, rosters, campus empty and classrooms locked, amil box mixups). The instructor had high praise for the project director and his staff - "really did the maximum they could to help." He also complimented V.P. Singh and Mort Pyle, instructors in the regular electronics program.

"You don't see really valuable things that happen until after two to three years," the instructor said. He suggested the legislature fund longer programs and conduct evaluations over a longer period of time.

Instructors working in industry bring valuable expertise. This instructor shared the difficulty of working 40 to 60 hours on a regular job and then finding time to prepare for a class. He suggested approaching industry to give employees who teach release time for preparation.

The program instructor and the second year instructor from the electronics program who worked closely with the project believed this course should be expanded to two semesters.

The project director plans to offer an overview course in robotics for laymen in the spring. He also assigned another instructor to investigate expansion of the robotics program at Ohlone College. He worked on a project funded by the local Private Industry Council to develop a curriculum for robotic monitors.

QUESTION 7: Several weeks after the end of the program, how valuable did the students consider the courses? What additional courses would they recommend? Have they used the information on their jobs?

Four of the eleven who completed the program answered the mailed survey. Three intend to take additional courses in robotics, but have not selected specific courses or schools. Two felt the lab work was most beneficial. Others mentioned the review of digital and microprocessor and microprocessor interfacing. Least beneficial aspects for them included "too much general information for one semester," industrial robots, field trip, and "too much time on micros."

They recommended Ohlone College teach courses in troubleshooting the Hero, Build Your Own Robot, advanced digital and analog for design, aerospace mechanical engineering and electrical engineering, and maintenance of robots.

Final comments covered a range of concerns. They were:
"Applications are needed. How does a robot function in a factory."
"I would like to see a new form of education. A no grade learning concept."

"I enjoyed J. Rouland as an instructor, who apparently did his best getting the program off the ground. It seems unfortunate that this class couldn't have been offered a few years earlier...a late start, but better late than never. The community college system seems a little bit behind the industries, in general, but being ignorant of the California Community College system, I can't speculate as to the source(s) of this unfortunate situation. Thanks For This Opportunity."

V. RECOMMENDATIONS

A. Entry Level

The need for retraining is apparent. The need for more effective retraining is apparent. A higher percentage of those who retrain should find jobs in their new field. Who will offer it and how, in this researcher's mind, is still unclear. This program provided a few guidelines and raised more questions.

When considering format, the economic needs and expectations of the displaced workers and the jobs they can find without training must be balanced with the wages they can earn in the new occupation given enough training to make them competitive. Investing more money in fewer people should be considered.

Based on this study, a few suggestions are offered to funding sources and program operators designing future retraining programs for displaced workers.

1. Funding Sources

   a. If further study shows positive long term gains for displaced workers who retrain, build or renovate a suitable site for a Retraining Center to serve the Bay Area and offer competency based vocational training on an open entry-open exit basis. Various competency-based programs could be pilot tested at different community colleges before a commitment to a separate facility was made.

   b. Work with legislature to extend UI benefits to cover length of training necessary for highly skilled occupations or institute a Retraining Insurance fund to which workers would contribute.

   c. When funding individual projects, plan for longer periods of time between award of grant and beginning of classes.

   d. Look for pre-selection of faculty.

   e. Support testing of competency-based, modular programs.

   f. Conduct long term study and evaluation involving follow-up with employers, completers, and non-completers.

   g. Offer two-year grants to allow pilot projects adequate time for development.

2. Program Operators

   a. Assessment

      (1). Include individual screening to assess commitment, financial plan for the duration of training, emotional readiness, and expectations as well as academic skills.

(2). Exclude people who are extremely over-qualified as well as those underqualified for an intensive program, if curriculum not individualized.

(3). Make sure applicants are aware of prevailing wages, services available, roles and responsibilties of all parties.

b. Instruction

(1). Seek ways to increase instructor salaries in high demand fields.

(2). Select faculty before program begins. Involve full-time faculty to coordinate instructional aspects of the project and to teach, if possible.

(3). Evaluate instructors in time to change, if necessary.

(4). Re-examine curriculum - compressed is not enough.

(5). Consider competency-based, modular curriculum, so individuals can proceed at own pace and enter when laid-off.

(6). Prepare teachers to work with displaced workers. As individuals, many displaced workers have retrained at community colleges without incidence. . In a group, the adversarial neogtiating techniques many have learned seemed to be exercised more easily.

(7). Insure depth of training offered adequate to meet employer demands in that occupation and to make graduates competitive with most job seekers in that field.

(8). Include course on "How to Survive in College".

(9). Utilize computer aided instruction.

c. Counseling

(1). Plan for adequate counseling time to assist students during the program. Someone needs to be available on a full-time basis, even if this responsibility is shared by a coordinator.

(2). Encourage peer support.

(3). Have linkages to outside counseling, child care, transportation, and housing assistance established.

d. Placement

(1). Increase time spent on job search workshops after classes

conclude.

(2). Infuse job search and career development activities into curriculum.

(3). Include job development with job placement assistance.

e. Administration

(1). Assign coordinator to handle recruitment, selection, daily operations, reporting, placement, follow-up (full-time if a pilot, part-time otherwise)

(2). Offer on a regular basis for ease of operation

(3). Insure good communication between administration, staff throughout college, counselor, and students to make sure everyone is aware of purpose and to avoid unmet expectations.

The responsibility to find more effective methods of retraining is great. Newspapers, magazines, and television feature educators and industry leaders talking about the necessity of retraining. People believe them. When they are laid off, they enroll in college. Many of them do not have glowing memories of earlier school experiences. They are doing what they believe is necessary to support themselves and their families. Their goal is a job, not an education. The personal investment is great. Sacrifices by their families are significant. Imagine the disappointment and sense of failure, if they complete the training and then can't find a job. Excellence is imperative.

B. Upgrade Training

This grant from the Chancellor's Office gave Ohlone College the opportunity to pilot a new curriculum dealing with a state of the art subject in electronics and to buy the equipment necessary for its implementation. Support for these new programs must be continued. Community colleges are the source of most technical training at the technician level. Their programs must stay current to upgrade people working in local companies and to train future employees.

As a pilot, "bugs" were anticipated and provided the lessons necessary to offer a much improved program in the future. Primary needs involved defining target audience which leads to a narrower curriculum and marketing strategy. Ideas for several new courses were generated also.

Companies, particularly new ones in the area should be approached to provide instructors, demonstrations, field trips, and equipment. They have a vested interest in having quality vocational education available in their community.

APPENDIX 1

REGRESSION ANALYSIS FOR DISPLACED WORKER PROGRAM
GRADE POINT AVERAGE (GPA) COMPARED WITH ASSESSMENT SCORES

Table 1 - GPA x Math Assessment Scores

	N	Mean GPA	Mean Math	Lowest	SD	r
DW Electronics	15	3.0	10.4	8.1	1.4	.63
DW Drafting	8	3.4	10.3	7.3	2.4	.44

Table 2 - GPA x Reading Assessment Scores

	N	Mean GPA	Mean Reading	Lowest	SD	r
DW Electronics	15	3.0	11.8	7.3*	1.6	.35
DW Drafting	8	3.4	11.9	10.3	1.2	-.24

*English as a Second Language - Among other students lowest score 10.3

Table 3 - GPA x Reading + Math

	N	Mean GPA	Mean R + M	Lowest	SD	r
DW Electronics	15	3.0	22.2	19.3	2.2	.66
DW Drafting	8	3.4	22.2	18.6	3.0	.26

Table 4 - GPA x Interest Assessment

	N	Mean GPA	Mean Interest	Lowest	SD	r
DW Electronics	15	3.0	5	-1	2.4	.47
DW Drafting	8	3.4	5	3	1.3	.01

Table 5 - GPA x Composite (Math + Reading + Interest)

	N	Mean GPA	Mean Composite	Lowest	SD	r
DW Electronics	15	3.0	27.2	20.8	3.4	.77
DW Drafting	8	3.4	27.2	23.6	2.7	.28

APPENDIX 2

POINT BI-SERIAL CORRELATION
ASSESSMENT SCORES COMPARED WITH COMPLETION/CON-COMPLETION

Table 1 - Math Assessment x Completion/Non-Completion

	N	N Comp.	N N-Comp.	Mean Comp.	Mean N-Comp.	r	t
DW Electronics	27	17	10	10.4	11.9	-.44	-2.47
DW Drafting	27	8	19	10.3	8.6	.35	1.87*

* Critical value for t at 5% level is 2.060

Table 2 - Reading Assessment x Completion/Non-Completion

	N	N Comp.	N N-Comp.	Mean Comp.	Mean N-Comp.	r	t
DW Electronics	27	17	10	11.8	12.2	-.15	-.77
DW Drafting	27	8	19	11,9	11.5	.13	.66

Table 3 - Math + Reading Assessment x Completion/Non-Completion

	N	N Comp.	N N-Comp.	Mean Comp.	Mean N-Comp.	r	t
DW Electronics	27	17	10	22.2	24.1	-.42	-2.3
DW Drafting	27	8	19	22.2	20.1	.29	.66

Table 4 - Interest Assessment x Completion/Non-Completion

	N	N Comp.	N N-Comp.	Mean Comp.	Mean N-Comp.	r	t
DW Electronics	25	17	8	4.9	3.8	.24	1.20
DW Drafting	25	8	17	5	4.4	.19	

Table 5 - Composite Assessment x Completion/Non-Completion

	N	N Comp.	N N-Comp.	Mean Comp.	Mean N-Comp.	r	t
DW Electronics	25	17	8	27.2	28.5	-.20	-.98
DW Drafting	25	8	17	27.2	24.8	.34	

APPENDIX 3

ETHNIC BACKGROUND OR RACE - DEMOGRAPHICS

	Asian/ Pac. Is.	Black	Hispanic	White	Other
DW Program	5.5%	7.3%	23.6%	63.6%	0
DW Electronics	7.1	7.1	17.9	67.9	
DW Drafting	3.7	7.4	29.6	59.3	0
Ohlone College	12.1	3.5	10.1	67.7	6.6
Elec. Program	20.7	1.8	9.8	64.6	3.1
Elec. Class	16.7	0	12.5	66.7	4.1
Drafting Program	13.7	0	10.3	70.1	5.1
Drafting Class	18.2	0	9.1	63.6	9.1
Alameda County	7.8	18.4	11.8*	67	6.8
Fremont	7.2	2.5	14.	83.7	5.8
Newark	9.1	3.5	20.6	75.8	10.6

* Hispanic origin may be of any race in census data

APPENDIX 4

AGE DEMOGRAPHICS

Table 1 - Average Age

	Mean	Median
Displaced Worker Program		
(Drafting + Electronics)	34.24 yrs.	32.25 yrs.
DW Electronics	36.96	35.5
DW Drafting	31.73	29.16
Ohlone College	28.35	24.49
Regular Electronics Class	25.74	24
Regular Drafting Class	27.36	23

Table 2 - Grouped Data

Ages	College	DW Program	U.S. Labor Force
15 - 19	18.99%	0	7.7%
20 - 24	31.05	20	14.6
25 - 34	27.56	38	28.3
35 - 44	14.35	18	20.4
45 - 54	6.15	18	15.3
55 +	3.13	4	13.6

College Data - Spring 1984
U.S. Labor Force - Data for 1982 from Statistical Abrstract

Table 3 - Sign Test for Independent Samples

	Below Median	Above Median	
DW Electronics	4	19	23
Regular Elect. Class	17	3	20
	21	22	43

$x^2 = 16.96$ (Significant difference)

APPENDIX 5

EDUCATION - DEMOGRAPHICS

Table 1 - DW Program x Comparison Classes

	Mean	High	Low	N	SD	t
DW Electronics/Robotics	12.8	17	11	28	1.67	.33*
Regular Electronics Class	12.7	14	12	22	.77	
DW Drafting	11.7	14	9	25	1.02	-2.21**
Regular Drafting Class	12.7	17	11	11	1.62	

* No Significant difference
** Significant at 5% level

Table 2 - DW Program x Labor Force x College

	Elementary	High School		College		
	0 - 8	1 - 3	4	1 - 3	4	5+
Total Labor Force	13.5%	17.7%	37.7%	16.1%	8.9%	6.2%
Employed Labor Force	6.9	13.0	40.8	18.6	11.7	8.9
DW Program	0	11.3	69.8	1.9	5.7	
Ohlone College	unknown	62.0		19.4	10.5	

Labor Force Data for 1982 from Statistical Abstract

Table 3 - Average Education for Persisters x Non-Persisters

	N	Mean	Range: High	Low
* DW Electronics				
Persisters	18	12.4	16	12
Non-Persisters	10	13.6	17	11
* DW Drafting				
Persisters	8	11.9	13	10
Non-Persisters	17	11.7	14	9

APPENDIX 6

GENDER - DEMOGRAPHICS

Table 1 - Comparisons

	Female	%	Male	%	Total
DW Program	14	25%	41	75%	55
DW Electronics	5	18	23	82	28
Completers	3	17	15	83	
DW Drafting	10	37	17	63	27
Completers	4	50	4	50	8
Ohlone College	4,287	56.7	3,274	56.7	7,564
Electronics Program	19	12	145	88	164
Electronics Class	2	9	22	91	24
Drafting Program	31	26.5	86	73.5	117
Drafting Class	5	38.5	8	61.5	13
Labor Force - Alameda County		44.5		55.5	

Ohlone College - Fall 1983
Labor Force - 1980 Census Data from Association of Bay Area Governments
Gender Information on vocational programs 1982 - 83

Table 2 - Chi Square DW Drafting x Comparison Class

	Female	Male		
DW Drafting	10	17	27	
Regular Drafting Class	5	8	13	
	15	25	40	$x^2 = .008$*

*No significant difference (x^2 for .01 = 6.64)

Note: Chi square for electronics not computed, because of the small number of women in the comparison class makes the calculation unreliable.

APPENDIX 7

DISPLACED WORKER PROGRAM

JOB AND WAGE CHANGES

PREVIOUS JOB	NEW JOB	PREVIOUS WAGE	NEW WAGE
* Electronics/Robotics			
Maintenance	Electronics	5.35	6.00
Coil Winder		9.10	
End Line Mechanic		15.40	
Receiving Clerk		11.78	
Auto Assembler		11.72	
Shop Helper		10.00	
Material Clerk		7.00	
Shop Worker	Electronics	9.41	7.00
T.V. Repair		10.00	
Security Foreman		10.00	
Auto Assembler		12.00	
Millwright, Welder	Electronics	13.76	14.00
Auto Assembler		13.00	
Machine Operator		10.56	
Shift Supervisor		12.00	
Warehouse Manager	Electronic Tech.	15.00	11.00
Woodworker		9.93	
*CAD Drafting			
Quality Inspector	Junior Drafter	$ 5.00	$7.80
Cashier (Puerto Rico)	Drafter	2.60	8.00
Apprentice Butcher	CAD Drafter	7.49	8.25
Cost Accounting	Junior Drafter	11.62	7.50
Auto Assembler	Junior Drafter	9.35	7.50
Packer - Checker		9.83	
Cashier		7.50	
Laborer		11.15	